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| <b>PRE-APPEAL BRIEF REQUEST FOR REVIEW</b>   |  | Docket Number (Optional)<br>Sollectron 735  |   |
| I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to "Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR 1.8(a)] on <u>January 21, 2009</u><br>Signature <u>Robert Moll</u><br>Typed or printed <u>Robert Moll</u><br>name _____  |  | Application Number<br>10/774,115<br>First Named Inventor<br>Glen C. Shepherd et al.<br>Art Unit<br>2841                                 | Filed<br>February 6, 2004<br>Examiner<br>Tuan T. Dinh |
| Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.<br><br>This request is being filed with a notice of appeal.<br><br>The review is requested for the reason(s) stated on the attached sheet(s).<br>Note: No more than five (5) pages may be provided.   |  |   |   |
| I am the<br><input type="checkbox"/> applicant/inventor.<br><input type="checkbox"/> assignee of record of the entire interest.<br>See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/88)<br><input checked="" type="checkbox"/> attorney or agent of record.<br>Registration number <u>33,741</u><br><input type="checkbox"/> attorney or agent acting under 37 CFR 1.34.<br>Registration number if acting under 37 CFR 1.34 _____ |  | <u>Robert Moll</u><br>Signature<br>Robert Moll<br>Typed or printed name<br>650-567-9163<br>Telephone number<br>January 21, 2009<br>Date |   |
| NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.  |  |   |   |
| <input checked="" type="checkbox"/> *Total of <u>One</u> forms are submitted.  |  |   |   |

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US Application No. 10/774,115

**PRE-APPEAL BRIEF REQUEST FOR REVIEW - ARGUMENTS**

Applicants requested entry of amendments to claims 11, 14, and 25 to place them in better condition for appeal in amendment papers dated January 19, 2009. Specifically, applicants deleted "a surface mount component electrically connected to the conductive pad" in claims 11 and 25 and added a semicolon to claim 14. Claims 1-29 and 34 are pending.

In sections 3-4 of an Office action dated July 23, 2008 (the Office action), the Examiner rejected claims 1-29 and 34 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,811,736 to Lauffer et al. (Lauffer) and U.S. Patent No. 6,830,631 to Dishongh et al. (Dishongh).

Before we discuss this new ground of rejection, we should discuss the solder wicking problem that our invention addresses.

As illustrated in our Figure 1, when a conductive pad 32 is in close proximity to a via hole 38, the solder mask 34 won't prevent solder wicking into via hole 38. This is a matter of the gravity, the surface tension and the capillary action that the solder experiences. Even if some solder wicking into the via hole can be tolerated, the remaining solder will too often be insufficient to form a reliable solder joint 31 at the surface mount component 33.

In contrast, Lauffer teaches use of solder wicking to achieve its goal. As stated in Lauffer: "the solder is reflowed (i.e. heated) and thereby flows by gravity and surface tension well into hole 41, onto surface land 18, against surface land 38, by capillary action into the gap 51 between surface lands 18 and 38 and against lead 44 as illustrated" (See Lauffer's Figures 1-3 and col. 3, lines 40-65). Solder wicking is required to produce "the final solder arrangement" in Lauffer (See solder 55 in Lauffer's Figures 3, 6, 9, and 12).

As examiner admits, Lauffer has no plated via connected to a conductive trace (See Office action page 3). Instead, Lauffer's hole 41 is under the surface mount

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1 component, and hence, no need for a conductive trace. And the solder 55 fills the  
2 hole 41 by solder wicking (See Lauffer's Figures 3, 6, and 9). Thus, Lauffer  
3 describes solder-filled blind-vias at the terminal end of a surface mount  
4 component, which is the opposite of what is required in claim 1.

5 As examiner also admits, Lauffer fails to describe a solder mask that surrounds a  
6 plated via (See Office action page 3). And Lauffer's solder mask 53 fails to reduce  
7 solder formation at the terminal end of a surface mount component as recited in  
8 claim 1 (See Lauffer's Figures 3, 6, 9, and 12).

9  
10 Dishongh fails to counter Lauffer's teaching away. Instead, Dishongh's BGA  
11 package connects to the PCB through solder balls placed above vias, which  
12 promote solder wicking. And Dishongh's via plugs prove solder wicking exists  
13 (See Dishongh's Figure 1-2, col. 1, lines 13-30 and col. 2, line 51 through col. 3,  
14 line 25).

15 The examiner's rationale for combining Dishongh and Lauffer fails to present "a  
16 convincing line of reasoning supporting the rejection." Instead, examiner alleges  
17 it would be obvious to use Dishongh's teaching in Lauffer "to protect solder splash  
18 and prevent short circuit when the component connected to the substrate by  
19 solder" (See Office action pages 3-4). This rationale is unclear and insufficient to  
20 support combining Lauffer and Dishongh.

21  
22 Yet in *KSR International Co. v. Teleflex Inc.* 126 S.Ct. 1837 (2006) the U.S.  
23 Supreme Court required examiners state "some articulated reasoning with some  
24 rational underpinning to support the legal conclusion of obviousness." The  
25 Supreme Court left undisturbed the requirement that an examiner must present a  
26 "convincing line of reasoning supporting a rejection." MPEP 2144.

27  
28 In view of the above, the rejection of claim 1 involves clear legal and factual error  
29 given (1) Lauffer and Dishongh both teach away from claim 1, and (2) the  
30

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1 rationale for combining Lauffer and Dishongh fails to present a convincing line of  
2 reasoning supporting the rejection.

3 We understand that claim 1 should be interpreted broadly and consistent with  
4 Figures 4A and paragraph [0021] as set forth in *In re Morris*, 127 F.3d 1048, 1054,  
5 44 USPQ 2d 1023, 1027 (Fed. Cir. 1997) so we now turn to the specification and  
6 drawings.

7  
8 Figure 4A illustrates the solder mask 54 exposes a part of the conductive pad  
9 (e.g., the arms 96, 97) that extend beyond terminal sides 75, 76 of the component  
10 53 to facilitate solder formation (e.g., solder joints 41, 51) between the conductive  
11 pad and the terminal sides 75, 76. The solder mask 50 prevents solder formation  
12 at the terminal end to reduce solder formation at the first plated via 55 (paragraph  
13 0021).

14 Amended claim 1 captures these differences in requiring a substrate with a via  
15 and pad structure connecting a surface mount component to conductive layers of  
16 the substrate, comprising:

17 a surface mount component, wherein the surface mount component  
18 includes a package having an upper surface with solderable terminal sides and a  
19 terminal end;

20 a substrate;

21 a plated via connected to the conductive layers;

22 a solder mask surrounding the plated via; and

23 a conductive pad with a conductive trace connected to the plated via,  
24 wherein the solder mask exposes a part of the conductive pad that extends  
25 beyond the solderable terminal sides of the surface mount component to  
26 increase solder formation between the conductive pad and the solderable  
27 terminal sides and to reduce solder formation at the first plated via.

28  
29 In view of the above, claim 1 and its dependent claims are patentable over Lauffer  
30 and Dishongh.

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1 Dependent claim 2 is separately patentable, because it further requires that the  
2 solder mask covers a part of the conductive pad that extends beyond the  
3 solderable terminal end and reduces solder formation at the terminal end of the  
4 surface mount component. Lauffer and Dishongh clearly fail to teach or suggest  
5 claim 2.

6 Dependent claims 3-13 and 29 are separately patentable because each claim  
7 further requires, among other limitations, the limitations of claim 2.  
8

9 Claim 14 is patentable over Lauffer and Dishongh for at least the reasons  
10 presented in connection with claim 1.

11 In addition, dependent claims 15-28 are separately patentable because each claim  
12 further requires, among other limitations, that the first solder mask covers and  
13 reduces solder formation at the first terminal end of the surface mount  
14 component and the second solder mask covers and reduces solder formation at  
15 the second terminal end of the surface mount component.  
16

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18  
19 Respectfully Submitted,

20 *Robert Moll*  
21

22 Robert Moll  
23

24 Reg. No. 33,741  
25

26 1173 Saint Charles Court  
27

28 Los Altos, CA 94024  
29

30 Tel: 650-567-9153

Fax: 650-567-9183

Email: [rgmoll@patentplanet.com](mailto:rgmoll@patentplanet.com)